creates a device object, making way for the file system or other aspects of the operating system (or any applications executing thereon) to access the device.

5 The filter driver 354 selectively intercedes in this process by intercepting the port driver response to claims issued by the class driver 352 for fiber channel devices. For such claims, the filter driver compares the identified devices against the LUN IDs listed in the data table 354a. More particularly, for each LUN ID in the table 354a, the filter driver 354 applies the associated algorithm (which, as noted elsewhere herein) is part of each LUN ID) to the identifying information contained in each claim (or otherwise obtained for the underlying device, e.g., from its Page 83h and/or Standard Page information, for example, obtained via the port driver 356),
10 and compares the result with that LUN ID. If a match occurs, this indicates that the device has been assigned by the manager 20 to the associated host.

The filter driver 354 lets these claim requests (i.e., those for which there was a match) pass to and from the class driver 352 and port driver 356 in the normal course, such that the latter returns
15 a normal success code (for assigned LUNs otherwise available for claiming) and such that the former generates a corresponding device object.

If no match occurs for any of the LUN IDs in the table, i.e., where an attempt is made to claim a
20 LUN that has not been assigned, the filter driver 354 forces a failure return by the port driver 356, thus, preventing creation of a device object.

In this manner, the filter driver prevents the class driver 352 from creating disk objects –e.g., at system boot-up or whenever the port driver 356 is otherwise scanned -- for devices not listed in the table 354a and, thereby, prevents the file system (or other aspects of the operating system of the host, or any applications executing thereon) from accessing fiber channel devices other than

5   those assigned by the SAN manager 20.

In the event that a storage device, which was initially not assigned to the host, is subsequently assigned, e.g., at the request of an operator/administrator request via the SAN manager GUI, the disk manager 76 updates the filter driver table 354a to reflect the current list of assigned (or

10   unmasked) LUNs. The filter driver 354 (or other functionality in the agent 24 operating on the host) then invokes the port driver 356 to re-claim all storage devices 14 identified by the port driver 356 as being connected to the host. In this regard, the filter driver 354 simulates the operation of the class driver 352 at boot-up.

15   The filter driver 354 accomplishes this task by initiating "FIND_NEW_DEVICE" (or equivalent) calls for all SCSI addresses in the port driver structure. All claim requests for previously claimed devices fail, as do those for already masked devices. The claim requests for newly unmasked LUNs succeed, and the SCSI class driver 352 creates the new corresponding disk objects.

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In the event that a storage device which was initially assigned to the host is subsequently unassigned, e.g., at the request of an operator/administrator request via the SAN manager GUI, the disk manager 76 updates the filter driver table 354a and the filter driver 354 initiates a

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request to the host operating system to mark the disk object for the newly unassigned device as unusable.

A further appreciation of the operation of the illustrated portion of the modified operating system

5   350 may be attained through the discussion that follows.

A list of LUNs is stored and maintained in a common storage area, e.g., Windows NT registry. The list is used to communicate changes to the accessibility (such as assignment or unassignment) of LUNs to the operating system. During an assignment or an unassignment, the

10   list is updated and the disk manager 76 notifies the filter drivers 354 of the change. A LUN is considered assigned when the device object is accessible (unmasked) to the system. A LUN is considered unassigned when the device object is inaccessible (masked) to the system. The management of LUNs is thereby performed without changes to the hardware configuration, and without re-boot.

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An assignment is achieved by first, updating the LUN list in the common storage area (Windows NT registry) with the particular LUNs to assign. Then an I/O control (IOCTL) that corresponds to the filter driver 354 is sent to communicate the assignment to each LUN. When the filter driver 354 receives this IOCTL for any device that matches the devices in the list of assigned

20   LUNs, the device is unmasked. If a disk class object already exists for the LUNs, then all the objects are made available for access to the operating system. If a disk class object does not exist, then the LUNs are claimed using an IOCTL to find new devices. The actual masking bit is

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